IN THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the above-referenced application:

1. (Currently amended) A semiconductor device, comprising:

a semiconductor substrate;

an active region formed in the substrate proximate an upper surface of the substrate, the active region including at least one circuit element formed therein; and

at least one channel formed in a back surface of the substrate opposite the upper surface of the substrate, the at least one channel being formed proximate the active region;

wherein the at least one channel is substantially filled with at least one layer of a thermally conductive material and configured so as to provide a thermal conduction path for conducting heat away from the active region; and

wherein the at least one channel is formed substantially entirely through a length of the device between opposing sides of the device, so as to reduce a possibility of damage resulting, at least in part, from a mismatch in coefficients of thermal expansion between a material forming the semiconductor substrate and the thermally conductive material.

2. (Original) The device of claim 1, wherein the at least one channel is filled with the thermally conductive material such that the at least one filled channel is substantially planar with the back surface of the substrate.

3. (Original) The device of claim 1, wherein the at least one layer of thermally conductive material comprises a metal.

4. (Original) The device of claim 1, wherein the at least one layer of thermally conductive material comprises at least one of copper, aluminum, gold, silver, a copper alloy, and an aluminum alloy.

5. (Original) The device of claim 1, wherein the at least one layer of thermally conductive material has a thermal conductivity greater than a thermal conductivity of the substrate.

6. (Original) The device of claim 1, wherein the at least one channel comprises one or more sloped sidewalls.

7. (Original) The device of claim 1, wherein the at least one channel comprises a substantially v-shaped groove.

8. (Original) The device of claim 1, wherein the at least one channel is formed using an etching process.

9. (Original) The device of claim 8, wherein the etching process comprises anisotropic etching.

10. (Original) The device of claim 1, wherein the at least one channel is formed proximate the active region.

11. (Canceled)

12. (Original) The device of claim 1, wherein the at least one layer of thermally conductive material has a coefficient of thermal expansion that is substantially matched to a coefficient of thermal expansion of the substrate.

13. (Original) The device of claim 1, wherein the device has a cross-sectional thickness greater than or equal to about six thousandths of an inch.

14. (Original) The device of claim 1, further comprising a plurality of active regions formed in the upper surface of the substrate and a plurality of corresponding channels formed in the back

surface of the substrate, each of the channels being proximate a corresponding one of the active regions.

15. (Original) The device of claim 1, wherein the at least one channel is formed having a maximum height that is about two thousandths of an inch from the upper surface of the substrate.

16. (Original) The device of claim 1, wherein the at least one channel is formed having a maximum height that is about forty micrometers from the active region.

17. (Currently amended) A method for forming a semiconductor device comprising the steps of:

forming one or more active regions in a semiconductor substrate proximate an upper surface of the substrate, the active region including at least one circuit element formed therein;

forming at least one channel in a back surface of the substrate opposite the upper surface of the substrate, the at least one channel being formed proximate the active region; and

filling the at least one channel with at least one layer of a thermally conductive material so as to provide a thermal conduction path for conducting heat away from the active region;

wherein the at least one channel is formed substantially entirely through a length of the device between opposing sides of the device, so as to reduce a possibility of damage resulting, at least in part, from a mismatch in coefficients of thermal expansion between a material forming the semiconductor substrate and the thermally conductive material.

18. (Original) The method of claim 17, wherein the step of forming the at least one channel comprises etching at least a portion of the back surface of the substrate.

19. (Original) The method of claim 18, wherein the etching step comprises anisotropic etching.

20. (Currently amended) A semiconductor device, comprising:

a base; and

at least one integrated circuit die attached to the base, the at least one integrated circuit die comprising:

a semiconductor substrate;

an active region formed in the substrate proximate an upper surface of the substrate, the active region including at least one circuit element formed therein; and

at least one channel formed in a back surface of the substrate opposite the upper surface of the substrate, the at least one channel being formed proximate the active region;

wherein the at least one channel is substantially filled with at least one layer of a thermally conductive material and configured so as to provide a thermal conduction path between the active region and the base for conducting heat away from the active region; and

wherein the at least one channel is formed substantially entirely through a length of the at least one integrated circuit die between opposing sides of the at least one integrated circuit die, so as to reduce a possibility of damage resulting, at least in part, from a mismatch in coefficients of thermal expansion between a material forming the semiconductor substrate and the thermally conductive material.